

Extraction of essential oil from *Nigella sativa* using supercritical carbon dioxide : study of antibacterial activity.

ABSTRACT

The antimicrobial activity of *N. sativa* essential oil obtained by supercritical fluid extraction by carbon dioxide was investigated against Gram Positive and Gram negative strains, isolated from clinical specimens. Best conditions for Black cumin oil extraction are obtained at 400 bar, 40°C and a solvent flow rate of 25 g min⁻¹. The seed extracts were prepared by supercritical fluid extraction method. Filter paper discs impregnated with varying concentrations of *N. sativa* extract were tested by the disk diffusion method. Methicillin Resistant *Staphylococcus Aureus* (MRSA) ATCC strain (700968), *E. coli* ATCC strain (25922), *E. coli* 0157 ATCC strain (12799), Extended-Spectrum Beta-Lactamase (ESBL) *Klebsiella pneumoniae* ATCC strain (700603), Carbapenam Resistant acenitobacter *Baumannii* (CRAB) clinical strain and *Vibrio cholerae* 01 Ogawa and 0139 Bengal clinical strains were investigated. The inhibition zones of the Mueller Hinton agar in different extract concentrate ion showed that at 25 mg 20 µL⁻¹, 50 mg 20 µL⁻¹ and 100 mg 20 µL⁻¹, the inhibition zones increased accordingly in *S. aureus*. However, *N. sativa* was found to be inactive against ESBL producers (*E. coli* and *K. pneumoniae*).

Keyword: Antimicrobial activity; Gram positive and gram negative bacteria; *Nigella sativa*; Supercritical fluid extraction; University Putra Malaysia; Yemen.